CLAIMS

What is claimed is:

1. An optical disc discrimination apparatus for use in an optical disc reproducer which reproduces data from a plurality of different types of discs with a single optical pickup, the optical disc discrimination apparatus comprising:

an RF envelope generator which generates an envelope signal from an RF signal read from one of the discs which is loaded in the optical disc reproducer; and

a controller which detects an amplitude of the envelope signal at an off-track state of the loaded disc, and discriminates the type of the loaded disc using the detected amplitude.

2. The optical disc discrimination apparatus of claim 1, wherein said RF envelope generator generates the envelope signal by a peak hold and a bottom hold of the RF signal read from the loaded disc.

3. The optical disc discrimination apparatus of claim 1, wherein said off-track state is a state where only a focusing is accomplished before a tracking control of the loaded disc is performed.

4. The optical disc discrimination apparatus of claim 3, wherein said controller comprises:

an envelope amplitude detector which detects the amplitude of the envelope signal; and

a disc discriminator which compares a level of the detected amplitude with at least one predetermined reference level and discriminates whether the loaded disc is a CD, a DVD-ROM, or a DVD-RAM, based on the comparison.

5. The optical disc discrimination apparatus of claim 4, wherein said envelope amplitude detector samples the envelope signal between a maximum value and a minimum value into n sample signals at a zero cross interval, and obtains an average value of the

obtained n peak-to-peak values as the detected amplitude.

6. The optical disc discrimination apparatus of claim 4, wherein said at least one predetermined reference level is set based on conditions that a CD has a track pitch relatively larger than a DVD-ROM, thus having a larger change in the amplitude of the RF signal as an optical beam emitted by the optical disc reproducer traverses tracks thereof, and that a DVD-RAM has no change in the amplitude of the RF signal as the optical beam emitted by the optical disc reproducer traverses the tracks thereof.

7. The optical disc discrimination apparatus of claim 6, wherein said disc discriminator discriminates whether:

the loaded disc is the CD if a level of the detected envelope amplitude is larger than a first one of the at least one predetermined reference level;

the loaded disc is the DVD-ROM if the level of the detected envelope amplitude is smaller than the first predetermined reference level and larger than a second one of the at least one predetermined reference level; and

the loaded disc is the DVD-RAM if the level of the detected envelope amplitude is smaller that the second predetermined reference level.

8. The optical disc discrimination apparatus of claim 5, wherein said envelope amplitude detector detects a magnitude of peak-to-peak values of the n sample signals, and obtains the average value of the peak-to-peak values to determine the detected amplitude.

9. The optical disc discrimination apparatus of claim 8, wherein said envelope amplitude detector obtains the average value, represented by ENVp-p, in accordance with the equation:

$$ENVp-p = \frac{\sum [ENV\,max - ENV\,min]}{n} \quad \ldots.(1)$$

wherein n is the predetermined number of samples, ENVmax is the maximum value and ENVmin the minimum value.

10. The optical disc discrimination apparatus of claim 3, wherein said controller controls rotation of the loaded disc at a speed slow enough to maintain a focusing state with respect to each of the plurality of different types of discs in the off-track state.

11. The optical disc discrimination apparatus of claim 4, wherein said controller controls rotation of the loaded disc at a speed slow enough to maintain a focusing state with respect to each of the CD, DVD-ROM and DVD-RAM in the off-track state.

12. An optical disc discrimination method of discriminating a type of a disc for use in an optical disc reproducer which reproduces data from a plurality of discs with only a single optical pickup, the optical disc discrimination method comprising:

(a) obtaining an envelope signal from a RF signal detected from one of discs which is loaded in the optical disc reproducer at an off-track state of the loaded disc;

(b) detecting an amplitude of the envelope signal;

(c) comparing the amplitude of the envelope signal with at least one predetermined reference level; and

(d) discriminating whether the loaded disc is a CD, a DVD-ROM, or a DVD-RAM based on the comparison.

13. The optical disc discrimination method of claim 12, wherein said step (b) comprises:

sampling the envelope signal between a maximum value and a minimum value into a predetermined number of sample signals at a zero cross interval;

detecting the predetermined number of sample signals; and

obtaining an average value of the detected predetermined number of sample signals to detect the amplitude.

14. The optical disc discrimination method of claim 12, wherein said step (d) comprises discriminating the loaded disc as the CD, the DVD-ROM or the DVD-RAM, based upon a condition that a change in the RF signal amplitudes as an optical beam of the optical disc reproducer moves across tracks thereof differs from each other in the CD, the DVD-ROM, and the DVD-RAM, wherein,

a first one of the at least one predetermined reference level is larger than the amplitude of the RF signal detected from the CD, and

a second one of the at least one predetermined reference level is smaller than the first predetermined reference level and larger than the amplitude of the RF signal detected from the DVD-ROM.

15. The optical disc discrimination method of claim 14, wherein said step (d) comprises:

discriminating that the loaded disc is the CD if the amplitude of the envelope signal detected from the RF signal is larger than the first predetermined reference level;

discriminating that the loaded disc is the DVD-ROM if the amplitude of the envelope signal detected from the RF signal is smaller than the first predetermined reference level and larger than the second predetermined reference level; and

discriminating that the loaded disc is the DVD-RAM if the amplitude of the envelope signal detected from the RF signal is smaller that the second predetermined reference level.

16. The optical disc discrimination method of claim 13, wherein:

the detecting of the predetermined number of sample signals comprises detecting a magnitude of peak-to-peak values of the predetermined number of samples; and

the obtaining of the average value comprises obtaining the average value of the peak-to-peak values to detect the amplitude of the envelope signal.

17. The optical disc discrimination method of claim 16, wherein the obtaining of the average value, represented by ENVp-p, is determined in accordance with the equation:

$$ENVp-p = \frac{\sum [ENV\,\max - ENV\,\min]}{n} \quad \ldots.(1)$$

wherein n is the predetermined number of samples, ENVmax is the maximum value and ENVmin is the minimum value.

18. The optical disc discrimination method of claim 12, further comprising controlling a rotation of the loaded disc at a speed slow enough to maintain a focusing state with respect to each of the plurality of different types of discs in the off-track state.

19. The optical disc discrimination method of claim 13, further comprising controlling a rotation of the loaded disc at a speed slow enough to maintain a focusing state with respect to each of the CD, DVD-ROM and DVD-RAM in the off-track state.

20. An optical reproducer which reproduces data from a plurality of different types of discs using a single optical pickup, the optical disc discrimination apparatus comprising:

a data reproducing device which reproduces the data by illuminating an optical beam on a loaded one of the optical discs, receive the reflected optical beam, to generate an RF signal;

an RF envelope generator which generates an envelope signal from the RF signal; and

a controller which detects an amplitude of the envelope signal only when a focusing operation of the disc is being performed prior to a tracking control operation of the disc is being performed, to discriminate the type of the loaded disc, wherein the controller controls the reproduction of the disc in accordance with the discriminated disc type.

21. The optical reproducer of claim 20, wherein said controller comprises:

an envelope amplitude detector which detects an amplitude of the envelope signal; and

a disc discriminator which compares a level of the detected amplitude with at least one predetermined reference level and discriminates whether the loaded disc is a CD, A DVD-ROM, or a DVD-RAM, based upon the comparison.

22. The optical reproducer of claim 20, wherein said controller controls rotation of the loaded disc at a speed slow enough to maintain a focusing state with respect to each of the plurality of different types of discs during the focusing operation.

23. The optical reproducer of claim 20, wherein the optical beam is initialized to 635-650 nm during the focusing operation of the disc performed prior to the tracking control operation of the disc.

24. The optical reproducer of claim 20, further comprising:

an RF amplifier to amplify the RF signal output from the data reproducing device;

a focusing servo to output a focus control signal in accordance with a focus error signal of the RF signal and the discriminated disc type;

a pickup actuator to drive the data reproducing device for focusing based upon the

focus control signal;

a spindle motor to rotate the loaded disc in accordance with a servo control signal; and

a spindle servo to generate the servo control signal in accordance with the discriminated disc type and the amplified RF signal.

25. An optical disc reproduction method of reproducing data from a plurality of different types of discs using a single optical pickup, the optical disc reproduction method comprising:

reproducing the data by illuminating an optical beam on a loaded one of the optical discs, receive the reflected optical beam, to generate an RF signal;

generating an envelope signal from the RF signal; and

detecting an amplitude of the envelope signal only when a focusing operation of the disc is being performed prior to a tracking control operation of the disc is being performed, to discriminate the type of the loaded disc, and controlling the reproduction of the disc in accordance with the discriminated disc type.

26. The optical disc reproduction method of claim 25, wherein the discriminating of the type of disc comprises comparing a level of the detected amplitude with at least one predetermined reference level and discriminating whether the loaded disc is a CD, A DVD-ROM, or a DVD-RAM, based upon the comparison.

27. The optical disc reproduction method of claim 25, further comprising controlling rotation of the loaded disc at a speed slow enough to maintain a focusing state with respect to each of the plurality of different types of discs during the focusing operation.

28. The optical disc reproduction method of claim 25, further comprising initializing the optical beam to 635-650 nm during the focusing operation of the disc performed prior to the tracking control operation of the disc.